WHAT IS CLAIMED IS:

1. A method of remyelinating neurons comprising the steps of:

(a) isolating neural stem cells from the tissue of a donor,

(b) proliferating the isolated neural stem cells in a culture medium containing a growth factor to produce precursor cells,

(c) harvesting the precursor cells, and

(d) associating the harvested precursor cells with a demyelinated axon to effect remyelination.

2. The method of Claim 1 wherein the growth factor is epidermal growth factor.

3. The method of Claim 1 wherein the demyelinated axons ~~are those~~ is that of a recipient.

4. The method of Claim 1 wherein the precursor cells of step (b) are in neurospheres.

5. The method of Claim 3 wherein the donor is the recipient.

6. The method of Claim 3 wherein the recipient is human.

7. A method of remyelinating neurons comprising the steps of:

(a) isolating neural stem cells from the tissue of a donor,

(b) proliferating the isolated neural stem cells in a first culture medium containing a growth factor to produce precursor cells,

(c) differentiating the precursor cells in a second culture medium that is substantially free of said growth factor to produce oligodendrocytes, and

(d) associating the oligodendrocytes with a demyelinated axon to effect remyelination.

8. The method of Claim 7 wherein the culture medium of step (c) contains serum.

9. The method of Claim 7 wherein the growth factor is epidermal growth factor.

10. The method of Claim 7 wherein the association of step (d) occurs in the presence of type I astrocytes.

11. The method of Claim 7 wherein the association of step (d) occurs in the presence of platelet-derived growth factor.

12. The method of Claim 7 further comprising step of:

(e) adding type I astrocytes to the oligodendrocytes associated with the demyelinated axon.

13. The method of Claim 7 further comprising after step (d) the step of:

(e) adding platelet-derived growth factor to the oligodendrocytes associated with the demyelinated axon.

14. The method of Claim 7 wherein the precursor cells of step (b) are in neurospheres.

15. The method of Claim 7 wherein the demyelinated axons ~~are these~~ of a recipient.

16. The method of Claim 15 wherein the donor is the recipient.

17. The method of Claim 15 wherein the recipient is human.

18. A method for treating demyelinating disease comprising the steps of:

(a) isolating neural stem cells from the tissue of a donor,

(b) proliferating the isolated neural stem cells in a culture medium containing a growth factor to produce precursor cells,

(c) harvesting the precursor cells, and

(d) transplanting the harvested precursor cells to a position proximate to a demyelinated axon in a recipient having demyelinating disease to effect remyelination.

19. The method of Claim 18 wherein the growth factor is epidermal growth factor.

20. The method of Claim 18 wherein the disease is selected from the group consisting of multiple sclerosis, disseminated perivenous encephalomyelitis, neuromyelitis optica, concentric sclerosis, acute disseminated encephalomyelitides, post encephalomyelitis, acute hemorrhagic leukoencephalopathy, progressive multifocal leukoencephalopathy, idiopathic polyneuritis, diphtheric neuropathy, Pelizaeus-Merzbacher disease, neuromyelitis optica, diffuse cerebral sclerosis, central pontine myelinosis, and leukodystrophy.

21. A method for treating demyelinating disease comprising the steps of:

(a) isolating neural stem cells from the tissue of a donor,

(b) proliferating the isolated neural stem cells in a first culture medium containing a growth factor to produce precursor cells,

(c) differentiating the precursor cells in a second culture medium that is substantially free of said growth factor to produce oligodendrocytes, and

(d) transplanting the oligodendrocytes into a recipient having demyelinating disease.

22. The method of claim 21 wherein the culture medium of step (c) contains serum.

23. The method of Claim 21 wherein the growth factor is epidermal growth factor.

24. The method of Claim 21 wherein the disease is selected from the group consisting of multiple sclerosis, disseminated perivenous encephalomyelitis, neuromyelitis optica, concentric sclerosis, acute disseminated encephalomyelitides, post encephalomyelitis, acute hemorrhagic leukoencephalopathy, progressive multifocal leukoencephalopathy, idiopathic polyneuritis, diphtheric neuropathy, Pelizaeus-Merzbacher disease, neuromyelitis optica, diffuse cerebral sclerosis, central pontine myelinosis, and leukodystrophy.

25. A method of producing glial cells comprising the steps of:

(a) isolating neural stem cells from a donor,

(b) proliferating the isolated neural stem cells in a first culture medium containing a growth factor to produce precursor cells, and

(c) differentiating the precursor cells in a second culture medium that is substantially free of said growth factor to obtain glial cells.

26. The method of Claim 25 wherein the culture medium of step (c) contains serum.

27. The method of Claim 25 wherein the glial cells are oligodendrocytes.

28. The method of claim 25 wherein the glial cells are astrocytes.

29. The method of Claim 25 wherein the growth factor is epidermal growth factor.

30. The method of Claim 25 wherein the precursor cells of step (b) are in neurospheres.

31. Glial cells formed by the method of Claim 25.

32. A precursor cell in vitro living in a culture medium having a growth factor.

33. An oligodendrocyte derived from a precursor cell and living in a culture medium.

34. An astrocyte derived from a precursor cell and living in a culture medium.

35. A remyelinated neuron formed by the method of claim 1.